

Name: _____

Math 10F/IPC H.

Date: _____

Chapter 6 Linear Functions

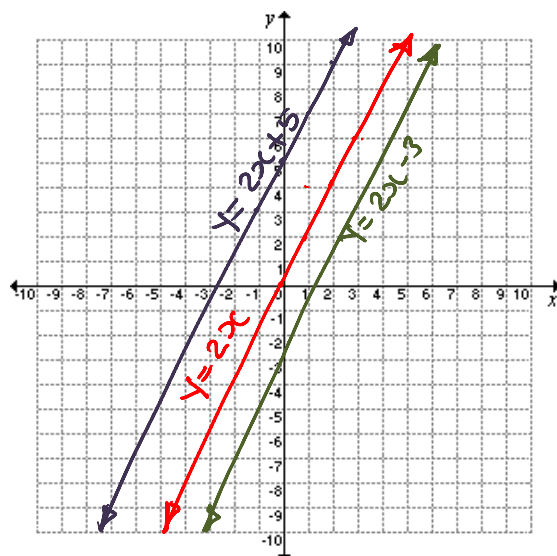
6.3/6.4: Slope-Intercept Form of the Equation of a Linear Function

Investigation #1:

$$y = mx + b$$

$m = \text{slope}$
 $b = y_{\text{int}}$

Graph out the following functions (use a table of values if needed to help you out):



1. $y = 2x$

$$m = \frac{2}{1}$$

$$b = 0$$

2. $y = 2x + 5$

$$m = \frac{2}{1}$$

$$b = 5$$

3. $y = 2x - 3$

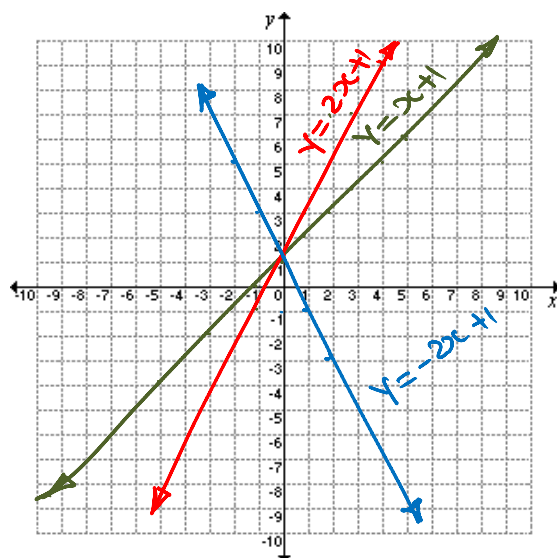
$$m = \frac{2}{1}$$

$$b = -3$$

In general, how does the 'b' in $y = 2x + b$ change the appearance of the graph?

Investigation #2:

Graph out the following functions (use a table of values if needed to help you out):



1. $y = x + 1$

$$m = 1$$

$$b = 1$$

2. $y = 2x + 1$

3. $y = -2x + 1$

$$m = \frac{-2}{1}$$

$$b = 1$$

In general, how does the 'm' in $y = mx + 1$ change the appearance of the graph?

m will change the direction of the line

If (m) is (+) the graph goes up to the right
If (m) is (-) the graph goes up to the left

In general, for the equation of a line in the form $y = mx + b \dots$

' m ' = $\frac{\text{slope-rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$ "b" = y_{int} where the line intersects with y -axis

This is also known as the slope-intercept form of the equation of a linear function (line)

Assignment 6.3: Page 356: 4, 5, 6 ✓

Quiz next day.

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Chapter 6 Linear Functions

6.3/6.4: Slope-Intercept Form of the Equation of a Linear FunctionExample 1: State the slope and y-intercept of the following equations.

a) $y = 5x - 2$

$$\text{slope} = m = 5$$

$$y_{\text{int}} = b = -2$$

b) $y = -\frac{1}{5}x + 6$

$$m = -\frac{1}{5}$$

$$b = 6$$

c) $y = 3$

$$y = 0x + 3$$

$$m = 0$$

$$y_{\text{int}} = 3$$

Example 2: Draw the lines on the grid to the right and then find the equations of the lines.

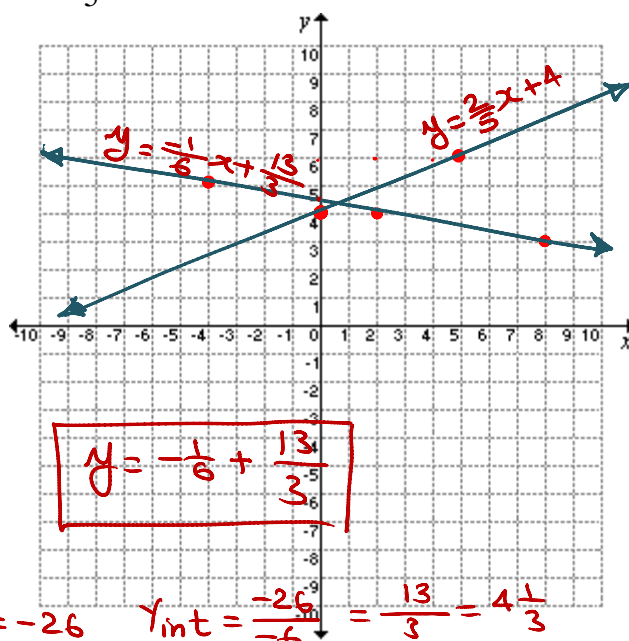
- a) Start at point A (0,4) and draw a line with a slope of
- $\frac{2}{5}$
- .

$$y = mx + b$$

$$m = \frac{2}{5}$$

$$b = 4$$

$$y = \frac{2}{5}x + 4$$



- b) Draw a line through B (-4, 5) with a slope of
- $-\frac{1}{6}$
- .

slope = $-\frac{1}{6}$

$y_{\text{int}} = ?$ when $x = 0$

$(0, y) \rightarrow (-4, 5)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$-\frac{1}{6} = \frac{5 - y}{-4 - 0}$$

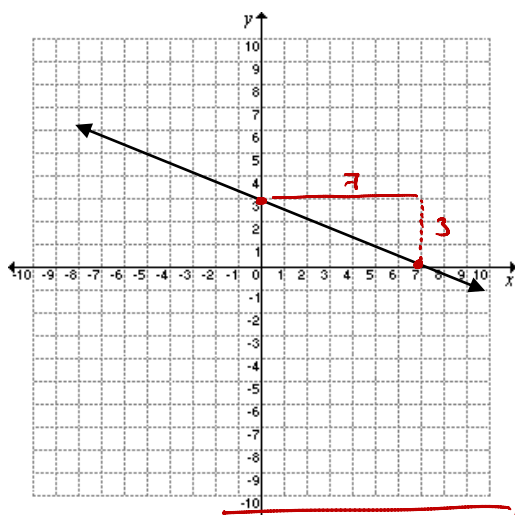
$$-\frac{1}{6} = \frac{5 - y}{-4}$$

$$4 = 30 - 6y \quad -6y = -26 \quad y_{\text{int}} = \frac{-26}{-6} = \frac{13}{3} = 4\frac{1}{3}$$

$$y = -\frac{1}{6}x + \frac{13}{3}$$

Example 3: Find the slope, y-intercept, and then write out the equation of the line.

a)

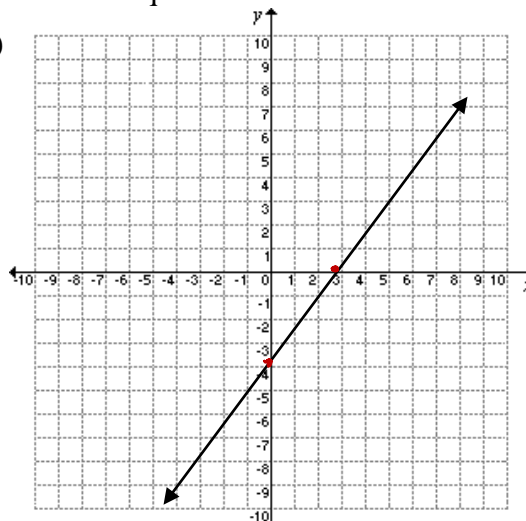


$$b = y_{\text{int}} = 3$$

$$m = -\frac{3}{7}$$

$$y = -\frac{3}{7}x + 3$$

b)



$$y_{\text{int}} = -4$$

$$m = \frac{4}{3}$$

$$y = \frac{4}{3}x - 4$$

Example 4: Graph the line. Don't use a table of values. (Find y-intercept, then slope.)

a) $y = \frac{2}{3}x - 1$

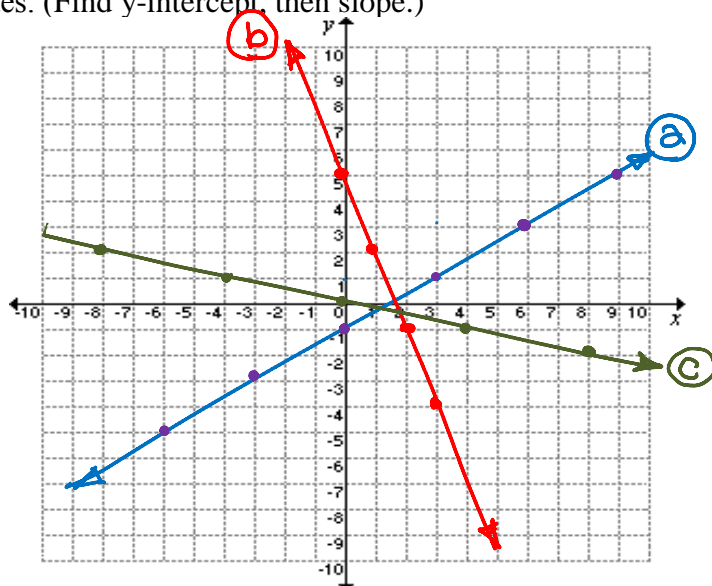
$m = \frac{2}{3}$
 $b = -1$

b) $y = -3x + 5$

$m = -3$
 $b = 5$

c) $y = -\frac{1}{4}x$

$m = -\frac{1}{4}$
 $b = 0$



Example 5: On the grid to your right...

- a) Draw a line through P (3, -1) with a slope of -3 and then find the equation of the line.

$m = \frac{-3}{1}$
 $b = 8$

$\frac{-3}{1} = \frac{-1 - y}{3 - 0}$
 $\frac{-3}{1} = \frac{-1 - y}{3}$

$y = -3x + 8$

$y_{int} (0, y) \Rightarrow (3, -1)$ $-1 - y = -9$ $y = 8$

- b) Draw a line through K (5, 4) that is parallel to the line in part a.

Then find the equation of this new line.

$m = \frac{-3}{1}$

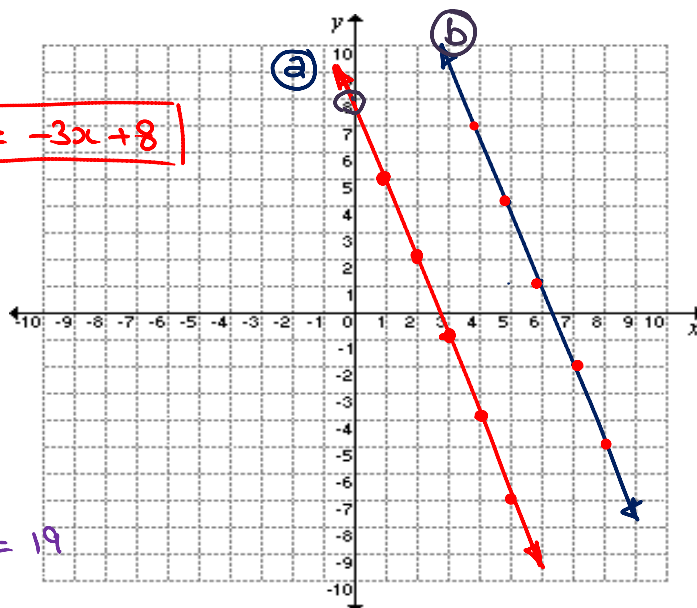
$\frac{-3}{1} = \frac{4 - y}{5}$

$y_{int} (0, y) \Rightarrow (5, 4)$

$-15 = 4 - y$
 $-y = -19$

$y_{int} = 19$

$y = -3x + 19$



- c) Draw a line through K (5, 4) that is perpendicular to the line in part a. Then find the equation of this perpendicular line.

\perp line has slope of $\frac{1}{3}$

K (5, 4), $(0, y_{int})$

$\therefore \frac{1}{3} = \frac{y_{int} - 4}{0 - 5}$

$m = \frac{1}{3}$

$-5 = 3y - 12$

$12 - 5 = 3y$

$7 = 3y$

$y = \frac{7}{3}$

Equation

$y = \frac{1}{3}x + \frac{7}{3}$

Example 6: An equation of a line is $y = mx + 5$. Determine the value of “m” when the line passes through the point $(-2, -13)$.

Example 7: To join KUMON+, an improved math system to KUMON, students need to pay a membership fee of \$25, plus a monthly fee of \$14.

- a) Write an equation for the total cost, “C” dollars, for “n” months at the math centre.
- b) Suppose Mr. Smith’s son went to the math centre for 2 years, what was the total cost?
- c) Suppose the total cost was \$515, how many months did Mr. Lee’s son use the math centre?

Example 8: The line represented by $y = 3x - 2$ and a line perpendicular to it intersect at R $(1, 1)$. Find the equation of the other line.

***Assignment Page 363: (4 - 7) do at least 3 from each;
8, 11, 12, 13, 14, 15, 17, 18, 20, 21, 22, 23, 24***